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RESULTS OF THE ALCOA FOUNDATION-SURINAME EXPEDITIONS. I. A NEW SPECIES OF BAT OF THE GENUS *TONATIA* (MAMMALIA: PHYLLOSTOMATIDAE)

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ABSTRACT

A new species of the phyllostomatine genus *Tonatia* is described from Suriname. The species is characterized by medium size, the presence of small wart-like granulations of the dorsal surfaces of the forearm, digits, and hind limbs and on the ears and noseleaf, and possessing a unique karyotype. Two specimens of the species were taken in the rainforests of central Suriname.

INTRODUCTION

Among the 2,250 specimens of bats collected on recent Carnegie Museum of Natural History field expeditions to Suriname are 50 individuals of the phyllostomatine genus *Tonatia*. There appears to be five species represented in this material. The commonest species are *Tonatia silvicola* and *Tonatia bidens* (Genoways and Williams, 1979). We also have two individuals of small-sized *Tonatia*, which is considered to represent a single species, *brasiliense* (Gardner, 1976; Handley, 1976; Koopman, 1978; Genoways and Williams, 1979), and one specimen of the relatively rare species, *Tonatia carrikeri* (Husson, 1978). The two remaining specimens appear to combine characteristics

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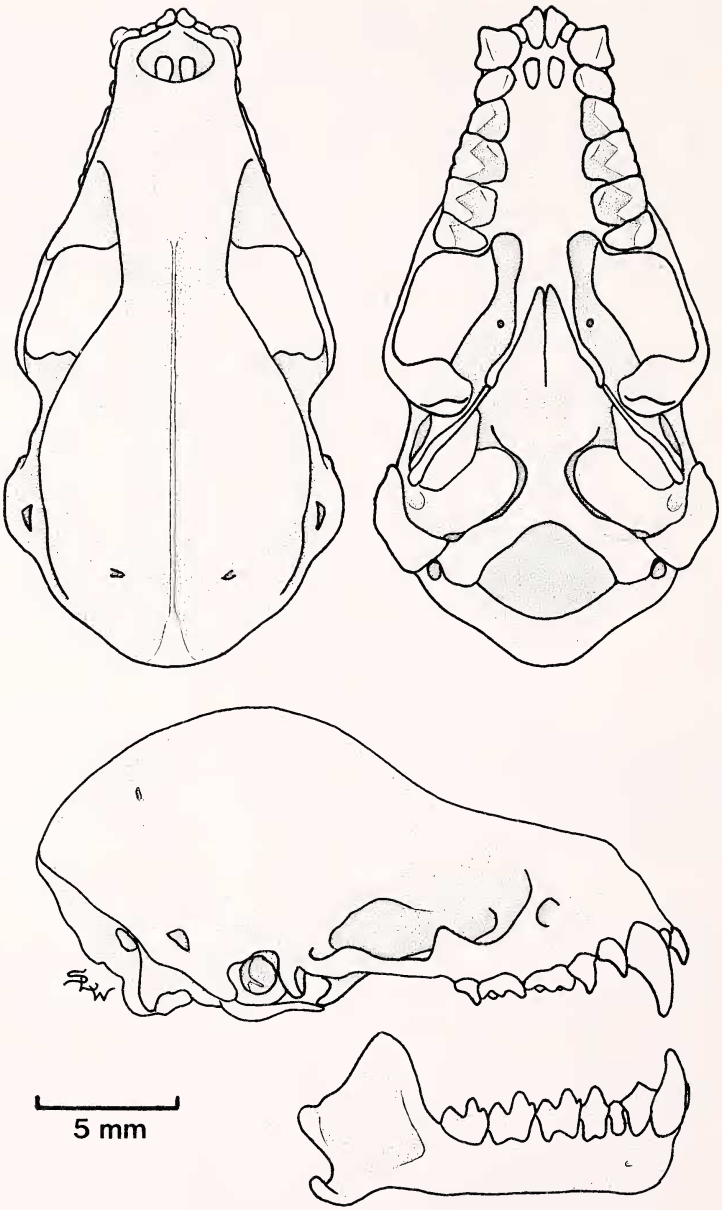

Fig. 1.—Dorsal, ventral, and lateral views of the cranium and lateral view of the lower jaw of the holotype of *Tonatia schulzi* (CM 63687).

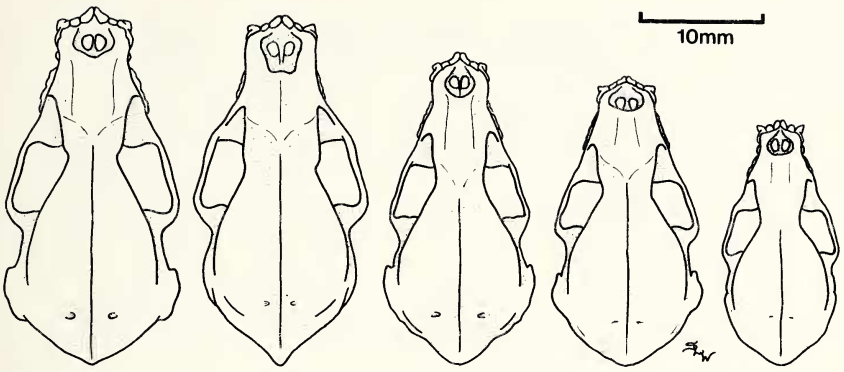

Fig. 2.—Dorsal views of the crania of five species of *Tonatia* from Suriname. From left to right, *T. silvicola* (CM 52779), *T. bidens* (CM 52776), *T. carrikeri* (CM 63668), *T. schulzi* (CM 63687), and *T. brasiliense* (CM 52777).

not found in other described species of the genus, of which we are aware, and are therefore considered to be an undescribed species. This new species is named and described below.

SYSTEMATICS

Tonatia schulzi, new species

Holotype.—Adult male, skin and skull, no. 63687 Carnegie Museum of Natural History (CM); from 3 km SW Rudi Kappelvliegveld, 320 m, Brokopondo, Suriname (3°46′N, 56°10′W); obtained on 1 October 1979 by Stephen L. Williams; original no. 4951; karyotype no. TK 11270.

Distribution.—The species is known only from the type locality and the nearby locality, 1 km N Rudi Kappelvliegveld, 300 m (3°48′N, 56°08′W). Both localities are within the Tafelberg Nature Reserve in central Suriname.

Diagnosis.—Size medium for the genus (Figs. 1, 2); venter slightly paler than dorsum but not white; forearm, digits, and hind limbs possessing small wart-like granulations on the dorsal surfaces; granulations also present on the ears and noseleaf; 2N = 28, FN = 36.

Measurements.—External measurements of the holotype followed by those of the paratype are as follows: total length, 79, 78; length of tail, 12, 13; length of hind foot, 13, 14; length of ear, 28, 29; length of calcar, 15, 16; length of tragus, 11, 10; length of noseleaf, 9, 10; width of noseleaf, 6, 6. Length of forearm and cranial measurements for *T. schulzi* as compared with other species of *Tonatia* occurring in Suriname are given in Table 1.

Table 1.—*External and cranial measurements of five species of* Tonatia.

Museum catalog number and sex	Locality	Length of forearm	Greatest length of skull	Condylobasal length	Zygomatic breadth	Postorbital breadth	Rostral breadth at canines	Breadth of braincase	Mastoid breadth	Length of Maxillary toothrow	Breadth across upper molars	Length of mandible	Length of mandibular toothrow
					Tonatia schulzi								
CM 63687 ♂	3 km SW Rudi Kappelvliegveld, Suriname	42.0	23.0	19.0	11.1	3.5	4.2	9.3	11.6	7.4	7.3	13.6	8.5
CM 63686 ♂	1 km N Rudi Kappelvliegveld, Suriname	43.3	23.3	18.9	11.0	3.5	4.1	9.2	11.8	7.5	7.2	13.6	8.5
					Tonatia carrikeri								
AMNH 30181 ♂	Rio Mocho, Venezuela (holotype)	47.3	25.8	21.8	12.2	3.9	5.1	9.9	12.8	8.5	7.9	16.9	10.8
AMNH 209322 ♂	Rio Itenez, Bolivia	45.1	24.5	20.2	11.1	3.6	4.6	9.5	11.3	8.0	7.6	15.0	9.2
AMNH 30183 ♀	Rio Mocho, Venezuela	46.7	24.8	19.7	10.7	3.5	4.8	9.5	11.3	8.2	7.5	14.9	9.4
CM 63668 ♀	Voltzberg, Suriname	45.8	25.0	20.3	11.2	3.8	4.4	9.7	12.2	8.1	7.6	14.6	9.2
					Tonatia brasiliense								
CM 52777 ♂	7 km S, 18.5 km W Afobakka, Suriname	35.5	19.6	16.6	9.2	3.0	3.7	7.9	8.8	6.6	6.1	11.9	7.5
AMNH 71619 ♂	Boca Curaray, Ecuador	33.9	19.4	16.5	9.0	3.0	4.1	7.7	8.8	6.9	6.2	12.4	7.6
CM 63667 ♀	Nieuwe Grond Plantation, Suriname	34.5	19.5	16.3	9.3	3.0	3.6	7.8	8.9	6.7	6.4	12.0	7.3

Table 1.—*Continued.*

Museum catalog number and sex	Locality	Length of forearm	Greatest length of skull	Condylobasal length	Zygomatic breadth	Postorbital breadth	Rostral breadth at canines	Breadth of braincase	Mastoid breadth	Length of Maxillary toothrow	Breadth across upper molars	Length of mandible	Length of Mandibular toothrow
	Tonatia bidens												
CM 52775 ♂	3 km S, 20 km W Afobakka, Suriname	56.5	26.8	23.3	13.2	5.3	5.1	10.0	12.5	9.2	8.3	17.2	10.1
CM 52776 ♂	Bigi Poika, Suriname	55.1	27.7	23.1	13.8	5.6	5.5	10.4	12.3	9.5	8.5	17.5	10.5
CM 63655 ♂	1.5 km W Rudi Kappelvliegveld, Suriname	54.5	27.5	23.1	13.7	5.3	5.4	10.3	12.6	9.4	8.5	17.2	10.3
CM 63657 ♂	3 km SW Rudi Kappelvliegveld, Suriname	55.9	27.9	23.5	14.0	5.1	5.4	10.5	12.6	9.6	8.5	17.4	10.6
CM 63666 ♂	Voltzberg, Suriname	56.7	28.0	23.6	13.9	5.3	5.2	10.0	12.7	9.2	8.7	17.6	10.6
CM 63660 ♀	Grassalco, Suriname	56.4	27.2	23.5	13.7	5.4	5.4	10.2	12.4	9.6	8.3	17.3	10.5
CM 63662 ♀	Grassalco, Suriname	52.7	27.0	22.5	13.3	5.3	5.3	10.5	12.6	9.0	8.0	16.8	10.2
CM 63663 ♀	Bitagron, Suriname	55.7	27.5	23.6	13.6	5.5	5.4	10.4	12.4	9.5	8.6	17.0	10.4
CM 63664 ♀	Voltzberg, Suriname	53.3	27.4	23.3	13.7	5.5	5.4	10.3	12.4	9.3	8.7	17.1	10.4
CM 63665 ♀	Voltzberg, Suriname	55.6	27.5	22.9	13.6	5.5	5.3	10.2	12.9	9.1	8.4	17.6	10.2
	Tonatia silvicola												
CM 63670 ♂	8 km S, 2 km W Brownsweg, Suriname	55.7	29.1	23.9	14.5	4.2	5.8	10.9	14.8	9.7	9.4	18.0	11.1
CM 63674 ♂	8 km S, 2 km W Brownsweg, Suriname	59.0	29.8	24.7	14.0	4.4	6.0	10.7	14.3	9.9	9.6	18.6	11.4
CM 63677 ♂	8 km S, 2 km W Brownsweg, Suriname	56.4	28.3	23.4	13.8	3.9	5.9	10.3	14.0	9.8	9.2	17.5	11.5
CM 63683 ♂	Voltzberg, Suriname	57.1	29.1	24.0	13.7	4.1	5.7	10.4	14.5	10.1	9.0	18.0	11.2
CM 63684 ♂	Voltzberg, Suriname	56.5	28.9	23.5	13.9	4.1	5.9	10.8	13.9	9.6	9.3	18.0	11.2
CM 63679 ♀	8 km S, 2 km W Brownsweg, Suriname	56.0	27.9	23.3	13.2	4.4	5.3	10.2	13.6	9.3	9.0	17.0	10.7
CM 63672 ♀	8 km S, 2 km W Brownsweg, Suriname	57.9	28.3	23.8	13.8	3.9	5.8	10.7	14.0	9.8	9.2	18.0	11.1
CM 63678 ♀	8 km S, 2 km W Brownsweg, Suriname	56.9	28.3	23.1	13.7	4.3	5.5	10.9	13.5	9.8	8.6	17.5	10.6
CM 63681 ♀	Raleigh Falls, Suriname	55.0	27.9	23.0	13.6	4.0	5.5	10.5	13.9	9.3	9.1	17.4	11.0
CM 63685 ♀	Voltzberg, Suriname	54.0	27.3	22.2	13.1	4.1	5.1	10.8	13.8	9.6	8.8	16.9	10.6

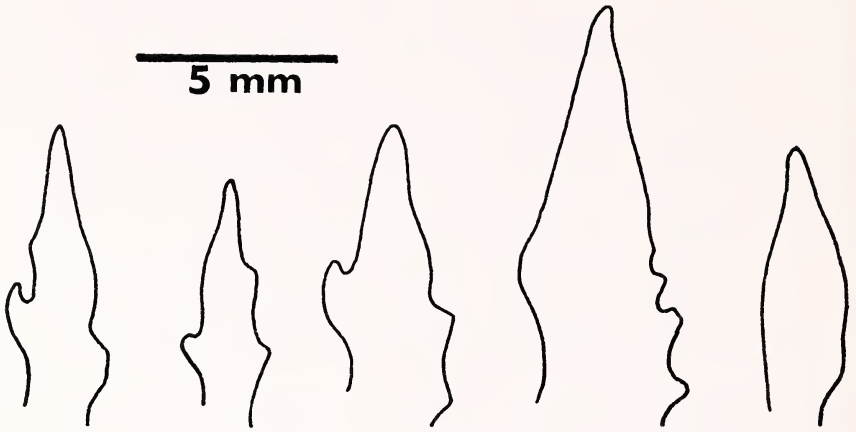

Fig. 3.—Tragus of five species of *Tonatia*. From left to right, *T. schulzi* (CM 63687), *T. brasiliense* (CM 63667), *T. carrikeri* (CM 63668), *T. silvicola* (CM 63674), and *T. bidens* (CM 63659). The left side of each illustration represents the inner margin of the tragus.

Description.—Hairs on the dorsum about 7 to 8 mm long; base of the hair pale, becoming almost white; remainder of the hair shaft Sepia in the holotype and Fuscous in the paratype (capitalized color terms from Ridgway, 1912) except for the extreme tip which is somewhat paler. Hairs on the venter about 6 mm long; basal white portion of hair half or more of the length of the shaft; overall coloration of the venter somewhat paler than dorsum being Drab to Grayish Olive. Postauricular patches thinly haired and paler than the remainder of the dorsum.

Small wart-like granulations present on the holotype on the dorsal surfaces of the bones of the wings and hind legs; including the thumbs, calcars, and all but the distal phalanges of each digit. Granulations visible on both surfaces of the ear and as a central vertical ridge on the noseleaf. Granulations definitely present on the paratype, but not as extensive as on the holotype; present on the forearms, metacarpels, tibias, ears, and noseleaf. These granulations appear, at least superficially, to be similar to those found on *Neoplatymops mattogrossensis* (Peterson, 1965).

Tragus attenuated but with a distinct projection on the inner margin (Fig. 3). Warts on the lower lip arranged in an outer and inner U-shaped pattern. Single low bands running from each ear meet near the middle of the forehead. Calcar longer than the hind foot.

Size, both external and cranial, intermediate for the genus being closest to *T. carrikeri*. Dental formula 2/1, 1/1, 2/3, 3/3. Outer upper incisors reduced in size with the canines nearly touching the medial incisors; lower incisors not enlarged; middle lower premolar reduced in size but still in the line of the toothrow. A sagittal crest present in both specimens but not highly developed.

Karyotype consisting of five pairs of biarmed elements and nine pairs of acrocentric elements; X-chromosome and Y-chromosome acrocentric; 2N = 28 and FN = 36 (see Honeycutt et al., 1980, for additional discussion and a figure of this karyotype).

Comparisons.—Size alone is nearly sufficient to distinguish *T. schulzi* from other members of the genus. It is much smaller than *T.*

bidens, T. evotis (Davis and Carter, 1978), and *T. silvicola* and much larger than *T. brasiliense*. The species nearest to *T. schulzi* in size is *T. carrikeri*; however, *carrikeri* seems to be somewhat larger than *schulzi* in most measurements (see Table 1 and Swanepoel and Genoways, 1979). *T. schulzi* is further distinguished from *carrikeri* by the color of the venter. In *carrkeri,* the underparts are pure white except on the chin and sides of the abdomen, whereas in *schulzi* the underparts are uniformly Drab to Grayish Olive although the bases of the hairs are white.

The presence of small wart-like granulations on the dorsal surfaces of the forearms, digits and hind legs and on the ears and noseleaf of *T. schulzi* is a characteristic found in no other member of the genus, or any other phyllostomatid bat. The tragus of *T. schulzi* appears to differ from that of the other four species of *Tonatia* in Suriname, with the projection on the inner edge of the tragus of *T. schulzi* being more prominent than on the other species (Fig. 3). The karyotype of *T. schulzi* (2N = 28, FN = 36) differs from *T. brasiliense* (2N = 30, FN = 56), *T. bidens* (2N = 16, FN = 20), *T. silvicola* (2N = 34, FN = 60), and *T. carrikeri* (2N = 26, FN = 46), but the karyotype of *T. evotis* is not known (Baker, 1979).

In addition to the characters above *T. schulzi* differs from *T. bidens* in the size of the lower incisors. *T. schulzi* resembles other members of the genus in having narrow lower incisors rather than the broad incisors of *T. bidens*. The sagittal crest is present in *T. schulzi* but it is not as highly developed as in *T. silvicola*.

Remarks.—Tonatia schulzi clearly has all of the generic characteristics of *Tonatia*. However, the numerous unique characteristics of the species make it impossible to determine its relationships within the genus. Not even karyological data can aid with determination of relationships at this time (Honeycutt et al., 1980).

The specimens were obtained in the Tafelberg Nature Reserve in central Suriname (Schulz et al., 1977). The vegetation around the base of Table Mountain consists of virgin lowland and lower montane rainforest except in the Kappel Savanna. Our localities were near the savannah but well within the rainforest. At 1 km N Rudi Kappelvliegveld, our nets were set on a hillside above a small stream. The overstory of the rainforest consisted of trees 100 or more feet tall. The understory was moderately dense consisting of ferns, palms, and broadleafed species. At 3 km SW Rudi Kappelvliegveld, the habitat was quite similar although there was no stream in the area and the understory was not quite as dense. At the first locality, the specimen was taken about 11 PM, whereas at the latter place, it was taken before 7 PM. Other species of bats that were collected with the holotype and paratype included *Saccopteryx bilineata, S. leptura, Pternonotus par-*

nellii, Chrotopterus auritus, Micronycteris megalotis, M. nicefori, Mimon crenulatum, Phylloderma stenops, Phyllostomus discolor, P. elongatus, P. hastatus, P. latifolius, Tonatia bidens, Anoura caudifer, Lonchophylla thomasi, Carollia perspicillata, Rhinophylla pumilio, two large species of *Artibeus* (currently under investigation to determine taxonomic relationship), *Uroderma bilobatum,* and *Vampyrops helleri.*

Etymology.—It is our pleasure to name this species in honor of Dr. Joop P. Schulz, Director of STINASU (Foundation for Nature Preservation in Suriname) in recognition of the work that he has done in establishing an extensive system of Nature Reserves in Suriname. We are particularly grateful to Dr. Schulz for the assistance that he has given us during our work in Suriname.

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Rodney L. Honeycutt, Jane A. Groen, and Carleton J. Phillips assisted with the collection and preparation of specimens. Robert J. Baker supplied the information on the karyotype of the species.

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